Lever-actuated high-pressure gas tap adjustable to different bottle necks

On the one hand there are taps with integrated regulators which comprise a lever for controlling the opening or closing of the valve which allows or prevents the gas contained in the bottle to flow to the outside and, on the other hand, taps without a regulator, which are able to be used in a central pressure-regulating station for example, but with an operating lever and optionally a manometer for reading the pressure of the gas contained in the bottle.

If a tap with an integrated regulator justifies the use of a specific protective cap or cowling, which protects the fragile components, allows access to the valve (on/off) and to the device for regulating the expansion pressure, does not interfere with the reading of the manometers and/or allows a guarantee seal to be fitted, then a single tap, intended to replace taps of the handwheel type for example, does not really justify the costly replacement of existing taps.

In a conventional use of an oxyacetylene station, an oxygen bottle and an acetylene bottle are grouped together in a trolley or against a wall and fixed by a chain, and it must be possible to read the manometer, fasten the regulator, adjust the regulator and read the manometers of the regulator without difficulty and without risk.

However, the oxygen bottle is generally higher than the acetylene bottle with the result that access to the tap of the acetylene bottle is difficult on the oxygen bottle side and impossible on the wall side. An additional constraint lies in the fact that it is desirable for reasons of production economy of scale for the taps of the various bottles to be as similar as

possible, which leads to the standardization of their components.

In the likewise conventional use of bottles connected by a line and supplying a centralized regulating device for example, the bottles are placed side by side against a wall and it must be possible to fit and remove the connection hoses, actuate the lever, and read the manometer of the tap without being obstructed either by the caps or by the adjacent bottles.

The taps are generally designed to be machined on transfer machines in which it is preferable for all the axes to be orthogonal. This arrangement has the advantage of being more economic in production terms but limits the layout possibilities for the components.

The taps of extinguishers which are commonly equipped with a manometer and with a lever are not covered by a cap and do not receive a regulator.

In the field of industrial gases, there are no taps with a lever.

The problem which has been set was therefore to find an organization of the components of a tap with a lever and with a manometer compatible with caps already existing on the bottles.

The tap/cap assembly must remain secure and convenient both during transportation and filling of the bottle and also during use, which may lead to a plurality of bottles being grouped side by side and often along a wall.

The solution of the invention consists of a tap with a lever adjustable to different bottle caps, in which the relative arrangements of the components accessible to or visible by the user, namely the lever, the manometer

and the inlet/outlet connector, solve the problem mentioned above.

The invention thus consists of a tap for a pressurized gas container for controlling the dispensing of a pressurized fluid, in particular a gas, comprising:

- a tap body of axis (XX) comprising an internal passage for the fluid, extending between an inlet orifice and an outlet orifice,
- a fastening base, of axis (XX), threaded at its external periphery and coaxially bearing the inlet orifice of the internal passage,
- an outlet connector of axis (BB) bearing the outlet orifice of the internal passage,
- a manometer of axis (AA) whose pressure take-off is connected to the internal passage,
- a mounting grip situated between the manometer and the fastening base,
- a lever pivoting about an axis (YY) perpendicular to the axis (XX) and cooperating with at least one valve arranged on the internal passage in such a way as to allow or to prevent the circulation of the fluid in said internal passage from the inlet orifice toward the outlet orifice,

characterized in that the height (H1) between the base of the tighening grip and the axis (AA) of the manometer is between 27 and 35 mm, the height (H2) between the base of the tighening grip and the axis (BB) of the connector is between 60 and 75 mm, and the height (H3) between the base of the tighening grip and the axis (YY) of the lever is between 50 and 110 mm.

Depending on the particular case, the tap of the invention may comprise one or more of the characteristics below:

- the height (H4) between the base of the tighening grip and the top of the body is between 80 and 120 mm;
- the height (H1) is around 30 mm, the height

(H2) is around 65 mm, the height (H3) is around 95 mm and/or the height (H4) is around 105 mm;

- the axis (XX) of the body and the axis (BB) of the connector are perpendicular;
- the angle (A1) between the plane passing through the axis (AA) of the manometer and through the axis (XX) and the plane passing through the axis (CC) of the lever and through the axis (XX) is between 75° and 105°, preferably around 90°;
- the angle (A2) between the plane passing through the axis (AA) of the manometer and through the axis (XX) and the plane passing through the axis (BB) of the connector and through the axis (XX) is between 0 and 45°, preferably around 30°;
- the lever cooperates with a valve via a movable rod acting on the valve;
- the lever pivots about the axis (YY) between at least one rest position in which the valve rests against the seat so as to prevent any exiting of fluid through the connector, and an active position in which the valve is spaced apart from the seat so as to allow the fluid to circulate in the internal passage and to exit via the connector;
- the valve is normally pushed back toward a valve seat through the effect of a spring means when the lever is in its rest position.

The invention also relates to a pressurized gas container, in particular a gas bottle, characterized in that it comprises a tap and a protective cowling surrounding all or part of said tap.

The invention will be explained in more detail below with reference to the appended figures, in which:

- figure 1 is a representation in longitudinal section of a tap for a gas bottle according to the invention,
- figure 2 is a side view of the tap of figure 1,
- figure 3 is a view in section along D-D of

figure 6,

- figure 4 is a view in section along A-A of the tap of figure 2,

- figure 5 is a plan view of figure 2,

- figure 6 is a view in section along B-B of figure 2,

- figure 7 shows a tap according to the invention covered with a plastic shell 21 serving as a casing for it,

- figure 8 represents the tap of figure 7 inserted into a protective cowling 50, the tap being in the rest position (gas turned off),

- figure 9 represents the tap of figure 7 inserted into a protective cowling 50, the tap being in the active position (gas turned on).

Figure 1 schematically illustrates a tap according to the invention having a lever 2 and manometer 5 and providing good ergonomics both during filling and emptying of the bottle to which it is fastened and while the bottle is being handled. This tap is composed of a body 1 comprising a mounting grip 11 of square or rectangular cross section, a conical connector 12 for sealed fastening to the bottle, a mount 13 supporting the lever 2 and allowing it to pivot about the pin 21. The lever 2 comprises two flat surfaces 22 and 23 which can bear on a pusher 3 applied against the lever 2 by a spring 31. The pusher 3 is secured to a rod 32. When the lever 2 is in the rest or off position, represented in figures 1 and 2, the assembly formed by the pusher 3 and the rod 32 is in a position in which it is brought closer to the axis (YY). Pivoting the lever 2 such that the surface 23 comes into contact with the pusher 3 causes the assembly 3, 32 to move and, as it moves away from the axis (YY), to enter into contact and then move the valve 33, which leaves its seat 34 and allows the gas to pass through the component 37, from inside the bottle toward the connector 4. A boss 41 of the body 1, which is bored and provided with an internal thread,

makes it possible to fasten and to supply gas to the manometer 5, which indicates the pressure of the gas circulating in the tap body 1, and thus also contained in the bottle.

In order to be able to enter a cap, the assembly must pass through a circle with a diameter below 75 mm and be contained in a cylinder centered on the axis of the bottle with a diameter smaller than the inside diameter of the cap, namely 88 mm, and its height H4 must not exceed 110 mm. The double condition of the 75 mm and 88 mm diameters results from the fact that it is possible to imagine a tap such that certain parts are inscribed in a circle of 75 mm diameter, the center of which is not in the axis of the bottle; such a tap is able to be covered only partially by the cap if the distance between the center of said 75 mm circle and the axis of the bottle is greater than 13 mm.

To allow effective use of the lever 2, access to the connector 4 and the possibility of reading the manometer 5 when the tap is protected by a cowling, the angles and distances below have been determined after numerous tests carried out under use conditions (fitting a regulator to the connector 4 without the tail of the regulator striking the manometer 5; operating the lever; adjusting the regulator) with different regulators, under filling conditions and under transportation conditions, with right-handed and left-handed operators of different sizes.

The possible dimensions corresponding to the criteria set within the scope of the invention are given in the tables below.

TABLE 1

Height	Maximum value (mm)	Minimum value (mm)	Preferred value
H1	35	27	30
H2	75	60	65
H3	110	50	95
H4	120	80	105

H1 denotes the height between the base of the tighening grip 11 and the axis of the manometer

H2 denotes the height between the base of the tighening grip 11 and the axis of the connector 4

H3 denotes the height between the base of the tighening grip 11 and the axis of the lever 21

H4 denotes the height between the base of the tighening grip 11 and the top of the tap

TABLE 2

Offset	Maximum	Minimum	Preferred
D1	30	0	0

The offset D1 is that between the axis of the tap (XX) and the axis of the connector 4.

TABLE 3

Angle	Maximum	Minimum	Preferred
A1	105°	75°	90°
A2	45°	0°	30°

The angle A1 is that between the plane passing through the axis of the manometer 5 and the plane passing through the axis of the lever 2.

The angle A2 is that between the plane passing through the axis of the manometer 5 and the plane passing

through the axis of the connector 4.

In a variant, if the tap is intended particularly for equipping bottles used in centralized pressure-regulating systems, the connector 4 can be transferred to the back of the tap, in this instance the angle A1 becoming 75° (+/-) and the angle A2 becoming 165° (+/-).